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# मानक

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*Indian Standard*

SPECIFICATION FOR  
SISAL AGRICULTURAL TWINES

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INDIAN STANDARDS INSTITUTION  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
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# *Indian Standard*

## SPECIFICATION FOR SISAL AGRICULTURAL TWINES

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# *Indian Standard*

## SPECIFICATION FOR SISAL AGRICULTURAL TWINES

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 15 September 1984, after the draft finalized by the Cordage Sectional Committee had been approved by the Textile Division Council.

**0.2** Sisal agricultural twine is a monofilament twine intended to be used in agriculture notably for binding the bundles on automatic pick up balers or the sheaves on reaping and binding machines or on similar machines.

**0.3** This standard is based on ISO 5080-1977 'Sisal agricultural twines' issued by the International Organization for Standardization (ISO). However, the following main deviations have been made to suit the internal conditions:

- a) 'Mass of twine packages' has been included as a requirement.
- b) 'Code number' has been replaced by 'variety number'.
- c) 'Runnage' has not been incorporated as a requirement.
- d) Breaking load test method has been prescribed as in IS : 1670-1970\*.
- e) Sampling clause has been changed.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard prescribes the requirements of three varieties of sisal agricultural twines.

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\*Method for determination of breaking load, elongation at break and tenacity of yarns ( *first revision* ).

†Rules for rounding off numerical values ( *revised* ).

## 2. TERMINOLOGY

**2.1** For the purpose of this standard, the definitions as given in IS : 3871-1984\* shall apply.

## 3. MANUFACTURE

**3.1 Sisal Fibre** — The fibre used for the manufacture of the twine shall consist of new genuine fibre of long staple, it shall be unadulterated, free from defects and true to form as sisal ( *Agave sisalana* ).

**3.2 Twine** — Each spool of twine shall be capable of working with continuity throughout its length. The twine shall have Z twist.

**3.3 Lubrication** — For the purpose of dressing the fibre, a lubricant shall be added.

## 4. REQUIREMENTS

**4.1 Mass of Twine Packages** — The net mass of twine packages shall not differ by more than  $\pm 5$  percent from the mass of the same length of twine as calculated from the linear density given in Table 1.

**4.2** The twines shall also conform to the requirements as laid down in Table 1.

**TABLE 1 REQUIREMENTS OF SISAL AGRICULTURAL TWINES**

( Clauses 4.1 and 4.2 )

VARIETY No.	LINEAR DENSITY	MINIMUM BREAKING LOAD	MINIMUM EXTRACTABLE LUBRICANT	APPLICATION
(1)	(2)	(3)	(4)	(5)
	tex	daN*	percent	
1.	6667 + 579 - 494	98	13	} For high and medium density bailing
2.	5000 + 435 - 370	69	13	
3.	3333 + 290 - 247	40	13	
METHOD OF TEST	A-1	IS : 1670-1970†	A-2	—

\*1 daN ( decanewton ) = 1.02 kgf approximately.

†Method for determination of breaking load, elongation at break and tenacity of yarns ( *first revision* ).

\*Glossary of terms relating to fibre ropes and cordage ( *first revision* ).



## 5. COMMERCIAL PRESENTATION

5.1 The twines shall be wound in spools.

5.2 The maximum dimensions of the spools shall be as follows:

	<i>Height</i>	<i>Diameter</i>
	mm	mm
Twine for high and medium density bailing	280	260
Twine for low density bailing and binding	195	208

5.3 The spools shall be packed as agreed to between the buyer and the seller.

## 6. MARKING

6.1 Each package of spools shall be marked with the following:

- Name of the material;
- Net mass of the package;
- Manufacturer's name, initials or trade-mark; and
- Month and year of manufacture.

6.1.1 The packages containing spools may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 7. SAMPLING

7.1 **Lot** — The quantity of spools of sisal twine of the same variety, delivered to one buyer against one despatch note shall constitute the lot.

7.2 The conformity of a lot to the requirements of this standard shall be determined on the basis of the tests carried out on the samples selected from the lot.

**7.3** Unless otherwise agreed to between the buyer and the seller, the number of spools to be selected at random from a lot shall be as given below:

<i>No. of Spools in the Lot</i>	<i>No. of Spools to be Selected</i>
Up to 150	3
151 to 300	4
301 „ 500	5
501 „ 1 000	7
1 001 and above	10

**7.4** For evaluating linear density, breaking load and extractable lubricant, the number of spools selected as in 7.3 shall constitute the test sample. The required test specimens shall be drawn from each of the spools in the test sample and subjected to corresponding tests.

## APPENDIX A

( Table 1 )

### METHODS OF TEST FOR DETERMINATION OF LINEAR DENSITY AND EXTRACTABLE LUBRICANT

#### A-1. DETERMINATION OF LINEAR DENSITY

**A-1.1 Principle** — Weighing under specified conditions, samples of specified length, than calculation of the linear density.

#### A-1.2 Apparatus

**A-1.2.1** Balance, accurate to 0.5 g.

**A-1.2.2** Warp-reel of known perimeter.

#### A-1.3 Samples

**A-1.3.1 Selection** — Select 30 m of twine from each spool as selected in 7.3 after discarding first 10 m of twine and wind them as adjacent turns ( without overlapping ) on the warp-reel, exercising just sufficient tension on the twine to maintain straightness. Each sample of 30 m thus obtained shall constitute a test piece.

**A-1.3.2 Condition** — The tests shall be carried out in an ambient atmosphere provided that the twine has been kept in conditions which do not damage its original properties.

In case of dispute, leave the samples for 48 hours in an atmosphere at  $65 \pm 2$  percent relative humidity and  $27 \pm 2^\circ\text{C}$  temperature ( *see* IS : 196-1966\* ) before continuing with the tests.

**A-1.4 Procedure** — Weigh each specimen to the nearest 0.5 g ( let  $m_1$  be the mass obtained in grams ).

### A-1.5 Expression of Results

**A-1.5.1 Calculation of Linear Density** — For each sample, calculate the linear density;  $T$  in ( tex ) using the following formula:

$$T = \frac{1000 m_1}{30}$$

where

$m_1$  = the mass ( g ) of the sample.

## A-2. DETERMINATION OF EXTRACTABLE LUBRICANT

**A-2.1 Principle** — Extraction by a suitable solvent of lubricants contained in a specific mass of twine, then weighing of lubricant residue after removing the solvent and drying.

### A-2.2 Apparatus

**A-2.2.1 Balance** — accurate to 0.05 g.

**A-2.2.2 Soxhlet Extraction Apparatus**

**A-2.2.3 Extraction cartridges** — for Soxhlet apparatus.

**A-2.2.4 Oven** — adjustable to  $103 \pm 2^\circ\text{C}$ .

### A-2.3 Samples

**A-2.3.1 Selection** — Select from each spool as selected in 7.3 about 10 g of twine, the total mass thus selected shall be enclosed in a plastic bag rolled up for despatch to the testing laboratory.

**A-2.3.2 Conditioning** — The tests shall be carried out in an ambient atmosphere provided that the twine has been kept in conditions which do not damage its original properties.

**A-2.4 Procedure** — Select a representative specimen, of mass at least 40 g, from the total mass obtained in A-2.3.1. If this cannot be extracted in one operation, divide this specimen into two and extract the two parts separately.

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\*Atmospheric conditions for testing ( *revised* ).

**A-2.4.1** Weigh the specimen or specimens together to the nearest 0.05 g, place them in an extraction cartridge and insert them into the Soxhlet apparatus after calibrating the extraction flask of the apparatus.

**A-2.4.2** Extract the lubricant for approximately 4 hours. Remove the excess solvent by distillation, then dry the lubricant residue in the oven, regulated at  $103 \pm 2^{\circ}\text{C}$ , for 3 hours. Cool to ambient temperature and weigh again.

**A-2.5 Expression of Results** — Calculate the extractable lubricant  $G$ , expressed as a percentage of the total mass of the specimens, by using the following formula:

$$G = \frac{100 m_2}{m_3}$$

where

$m_2$  = the mass, in (g) of extracted lubricant; and

$m_3$  = the total mass, in (g) of the specimens.

If necessary, take the average of the two results thus obtained.